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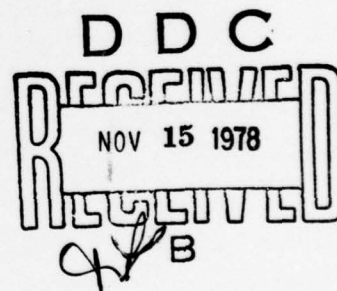
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**AN EVALUATION OF  
THE BIRD/AIRCRAFT STRIKE HAZARD  
DOVER AIR FORCE BASE, DELAWARE**

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APRIL 1978

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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER AFCEC-TM-1-78	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) An Evaluation of the Bird/Aircraft Strike Hazard at Dover Air Force Base, Delaware,		5. TYPE OF REPORT & PERIOD COVERED
6. PERFORMING ORG. REPORT NUMBER		7. CONTRACT OR GRANT NUMBER(s)
8. AUTHOR(s) Capt Larry T. Clark, Capt Michael/Lavey 1st Lt James S. Kent		9. PERFORMING ORGANIZATION NAME AND ADDRESS AFCEC/DEVN Tyndall AFB FL 32403
10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS JON: 00DEVN11		11. CONTROLLING OFFICE NAME AND ADDRESS AFCEC/DEVN Tyndall AFB FL 32403
12. REPORT DATE APR 1978		13. NUMBER OF PAGES 16
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) 12 24p.		15. SECURITY CLASS. (of this report) UNCLASSIFIED
15a. DECLASSIFICATION/DOWNGRADING SCHEDULE		
16. DISTRIBUTION STATEMENT (of this Report) Approved for public release; distribution unlimited.		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES Available in Defense Documentation Center		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Bird/Aircraft Strike Hazard Operational Procedures Animal Populations Habitat Modifications		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) The AFCEC Bird/Aircraft Strike Hazard (BASH) Team surveyed Dover AFB DE, from 6 March to 17 March 1978. During this period, operational procedures, vegetation, animal populations and habitats were studied. Special emphasis was given to bird hazards to aircraft. Specific recommendations for operational changes and habitat modifications aimed at reducing the BASH potential at Dover AFB are discussed.		

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# PREFACE

This study was performed under Program Element 91212F, AFCEC JON 00DEVN11. Inclusive dates of the study were 6 March to 17 March 1978.

The authors wish to thank personnel of the Bombay Hook National Wildlife Refuge, the Delaware Department of Fish and Wildlife, and Dover Air Force Base, Delaware for their cooperation in the study.

For your quick reference and use, a concise summary of observations and recommendations follows the Table of Contents.

This report has been reviewed by the Information Office (OI) and is releasable to the National Technical Information Service (NTIS). At NTIS it will be available to the general public, including foreign nations.

This memorandum has been reviewed and is approved for publication.

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## SUMMARY OF OBSERVATIONS AND RECOMMENDATIONS

1. OBSERVATIONS: A definite bird/aircraft strike hazard exists at Dover Air Force Base because of the following factors:

- a. Gulls feed or loaf on the airfield during adverse weather. They are also attracted because of security and various feeding opportunities.
- b. Waterfowl, gulls and blackbirds frequently overfly the base.
- c. Aircraft using the VFR patterns at Dover AFB maintain an altitude of 1500 feet MSL. Rectangular patterns for Runways 01, 19 and 32 overfly areas where large concentrations of waterfowl winter.
- d. Large populations of waterfowl winter in Delaware on the lands surrounding Dover AFB and at Bombay Hook Wildlife Refuge.
- e. Many small depressions and drainage channels collect standing water which provides habitats for a variety of birds.
- f. Raptors (birds of prey) hunt on or near the base. Refuges and other favorable habitats in the area maintain large raptor populations.
- g. During spring and fall migration, large blackbird flocks represent a significant bird strike threat.

2. RECOMMENDATIONS:

- a. A Bird Hazard Working Group should be formed to prepare a bird control and avoidance plan.
- b. A bird dispersal team should be established and should be made up of those who know about bird behavior and control.
- c. A BIRD WATCH plan should be developed to alert aircrews to possible bird strike hazards.
- d. Grass heights on the airfield should be kept between 18 and 30 centimeters to discourage gull feeding and loafing.
- e. The bird dispersal team should be equipped with shotguns or pyrotechnic pistols to disperse bird flocks and control their flight directions.
- f. Bioacoustics (recorded bird distress calls) should be used to disperse birds on the airfield.
- g. Air Traffic Control personnel must constantly watch for birds.



h. Departing aircraft should delay takeoff until hazardous birds have dispersed.

i. Arriving aircraft should be alert for bird flocks, especially when planning approaches to Runway 19. All arriving aircraft should remain above 3000 feet MSL as long as possible.

j. During periods of high bird activity, multiple approaches should be minimized to reduce bird strike possibilities.

k. Local night sorties and multiple approaches should be reduced during peak migration seasons.

l. Wire should be criss-crossed over channels to discourage birds from using the water.

m. Low areas on the airfield should be filled and planted to reduce water collection. Drainage ditches should be kept clear to reduce insect populations which may attract birds.

These observations and recommendations are addressed in more detail in the body of this report.

## Section I

### INTRODUCTION

Dover Air Force Base is a Military Airlift Command (MAC) installation occupying approximately 1477 hectares on the Piedmont Plateau in Kent County, Delaware. Its elevation varies from 1.5 to 10.7 meters above mean sea level (MSL). Principal aircraft using Dover AFB are the C-5 and the C-141. Future plans include the addition of a civilian terminal to the northwest portion of the airfield for joint use by the military and the city of Dover. Farmland adjoins the base on the north and west sides, and the city of Dover lies 5.6 kilometers north of the base (figure 1). The base is located in the Atlantic Flyway through which millions of birds migrate each year. Ducks, geese, swans, raptors (birds of prey), and blackbirds are among these migrants. Many of these birds spend the winter in the Dover area.

Water is an important characteristic of the region. Precipitation averages 117 centimeters per year (reference 1). Tidal marshes near the base drain into Delaware Bay which is less than 5 kilometers to the east. Chesapeake Bay lies 48 kilometers west of the base. Streams flow throughout the region, and water filled borrow pits are found near the south and northwest base boundaries. The abundance of water and location along the Atlantic Flyway make the region a prime waterfowl habitat. Bombay Hook National Wildlife Refuge is less than 10 kilometers northeast of the base, and Little Creek Wildlife Area is less than 1.5 kilometers east of the base (figure 1).

On-base vegetation consists of Kentucky bluegrass (Poa pratensis), chewing fescue (Festuca sp.), colonial bent grass (Agrostis tenuis), and red top (Agrostis alba), on 765 hectares of improved and semi-improved land (reference 1). Unimproved land is covered by scrub pine (Pinus virginiana), black gum (Nyssa sylvatica), cedar (Cedrus sp.), red maple (Acer rubrum), willow oak (Quercus thellos), honey locust (Gleditsia triacanthos), overcup oak (Quercus lyratras), Norway pine (Pinus resinosa), and a marsh grass (sp. unknown). Trees, shrubs, and grasslands on the base provide habitats for birds that are hazardous to aircraft.

A serious hazard exists from birds overflying or resting on the airfield. Gulls overfly the base in large flocks. During periods of rain, low ceilings, and low visibility, gulls land on the airfield in large numbers, feed on earthworms that crawl onto runways and taxiways, or loaf about the airfield. During cold weather, gulls have been observed resting on the airfield (reference 2). Large concentrations of waterfowl wintering in the area also present a hazard. While not found in large numbers on the airfield itself, their local flights cross the airfield and approach corridors each day. Raptors are also known to cause a number of bird strikes. Pest birds such as pigeons, Starlings, blackbirds, and sparrows were found in and around hangars and buildings.



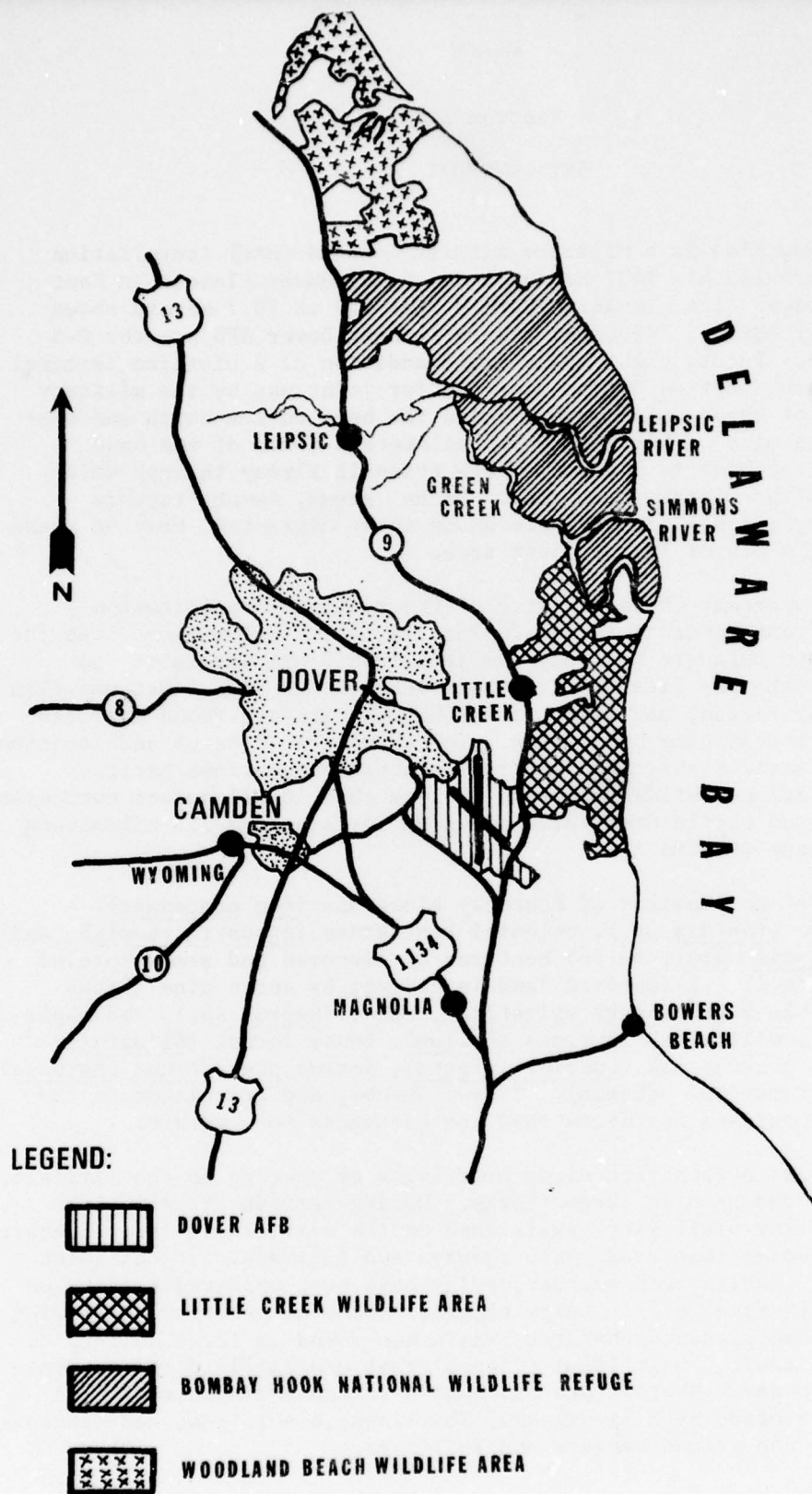


Figure 1. Dover AFB and Vicinity

Positive action is needed to reduce these hazards. This report includes a list of observations and recommendations to help the base reduce bird strike potentials. These recommendations include active control of on-base birds, habitat management to reduce airfield attractiveness, and operational modifications to help avoid bird strikes. The BASH Team strongly recommends developing an ongoing comprehensive Bird Hazard Management Plan. This plan will be the central core for a thorough and effective program.

## Section II

### OBSERVATIONS AND RECOMMENDATIONS

Recommendations for each observation in this report are listed in order of priority. If lack of manpower or funds prevents implementation of some recommendations, subsequent recommendations should then be accomplished.

#### A. BASE BIRD MANAGEMENT PROGRAM

Several methods of bird control have been successful in reducing airfield bird populations at various Air Force bases. These are discussed later in this report. No bird control program will ever completely eliminate all birds from the airfield environment. Gulls will continue to loaf or feed on the airfield during adverse weather. Waterfowl, gulls, and blackbirds frequently overfly the base and cannot be effectively controlled. When high bird densities occur on or over Dover AFB, temporary operational changes are needed to minimize the risk of bird strikes.

#### Recommendations

##### 1. Bird Hazard Working Group:

a. A Bird Hazard Working Group (BHWG) should be formed to prepare a bird control and avoidance plan to be implemented when a bird strike hazard exists. The group should be composed of representatives from Flying Safety, Civil Engineering, Flight Facilities, and Airfield Management. This group will develop procedures and assign responsibility for bird control, implement the plan, provide notification and information on bird hazards to aircrews, and coordinate operational modifications designed to reduce the bird strike threat to aircraft. The BHWG should meet regularly and may function as a portion of the base's Air Traffic Control Board. Additionally, emphasis should be given to reviewing operational procedures and starting informational programs before the fall bird migration. Operational procedures should be published as part of the plan and in Dover AFBR 55-3 to ensure compliance by local aircrews.

b. AFR 127-15, "Bird Strike Hazard Reduction Program," defines responsibilities for bird control. This regulation should be used as a guide for the BHWG in establishing and maintaining the base bird hazard reduction program. As part of this program, the base should try to document all bird strikes including aircraft type, altitude, time of day, bird species, degree of damage, repair cost and man-hours for repair, and geographic location of the strike. As described in AFR 127-15 all bird strikes should be documented on AF Form 441, "Bird Strike Report."



c. Two excellent sources of information on bird hazards and techniques for reducing the hazard are Bird Hazards to Aircraft (reference 3), and the ICAO Airport Services Manual (reference 4).

## 2. Bird Dispersal Team:

a. The base should establish a bird dispersal team composed of individuals trained in bird behavior and control techniques. The team must be capable of immediate response. When large numbers of birds are observed on the airfield, the team should begin dispersal procedures within five minutes. The team should be placed on standby at Base Operations when birds, primarily gulls, are present in large numbers, or if weather is conducive to gull presence on the airfield.

b. The BASH Team will train members of the bird dispersal team, either at the Air Force Civil Engineering Center, or during an actual survey. Prior coordination with AFCEC is required for this training, which could be accomplished in a two or three day TDY.

c. The bird dispersal team should be equipped with a vehicle for bird dispersal which is equipped with cassette replay equipment listed below for playing taped bird distress calls. The team should also obtain the following equipment for use in identifying and controlling airfield bird populations:

- \*- binoculars prism type (NSN 1240-00-5300959YP)
- \*- shotgun, single barrel (NSN: 1005-00-973-5645)
- \*- pistol, pyrotechnic, M-1 (NSN: 1095-00-726-5657)
  - simulated airburst, M-74 (NSN: 1370-028-6007)
  - shotgun shells, 12 ga #4 or #6 shot
- \*\* cassette tape player (NSN: 5835-01-053-3152)
- \*\* speaker (NSN: 5965-01-053-6210)
- \*\* amplifier mobile (NSN: 5830-01-054-4954)

\* Indicates item authorized in TA 483

\*\* Stocklist action has been completed and upon receipt of assigned NC/NSN items will be added to TA 483.

d. Procedures must be established for storage of pyrotechnic devices in a secure place at Base Operations. The equipment must be immediately available for rapid response. If the team cannot respond on short notice, bird control effectiveness will be reduced and aircraft will be subjected to either unnecessary and costly delays or increased bird strike potentials. Rapid response is the key to bird dispersal team success.

e. All birds, except the Domestic Pigeon, (Columba livia) House Sparrow, (Passer domesticus) and Starling (Sturnis vulgaris), are protected by federal law. Therefore, the team must obtain a federal depredation permit from the US Fish and Wildlife Service before killing any protected birds.

### 3. BIRD WATCH:

a. To assist in informing pilots of bird densities requiring temporary changes in operations, the term "BIRD WATCH" should be used. BIRD WATCH, which is similar to the MET WATCH for severe weather, alerts the aircrews to a possible flight hazard due to increased bird activity. Declaration of BIRD WATCH could be incremental (i.e. BIRD WATCH GREEN, BIRD WATCH YELLOW, BIRD WATCH RED) and would depend on what operational changes for bird avoidance are recommended by the BHWG. The Chief of Airfield Management should declare BIRD WATCH and implement procedures for reducing the bird strike risk. His declaration should be based on information provided by the Supervisor of Flying, tower personnel, or the aircrews themselves.

b. BIRD WATCH conditions should be radioed to aircrews by air traffic control personnel. Automatic Terminal Information Service (ATIS) is of particular value in identifying hazards which are rapidly changing or temporary in nature. The use of Notices to Airman (NOTAMs) is encouraged for severe situations which may affect air safety for several days or longer. An example would be the arrival of the thousands of geese and swans which overwinter in the local flying area each year. The NOTAM might remain in effect until the birds migrate north in spring.

### B. GULLS

During much of the year, large numbers of gulls are found in the Dover area. Primary species include Herring Gulls (Larus argentatus), Ring-billed Gulls (L. delawarensis), and Laughing Gulls (L. atricilla) (reference 7). Gulls are a significant hazard to aircraft arriving or departing Dover AFB. This is primarily because they loaf or feed on the airfield in large flocks, especially during periods of adverse weather (figure 2). Large numbers of gulls were observed on the paved surfaces of the airfield, as well as the short airfield grasses. Gulls may be expected to create the greatest hazard from April through December.

When gulls are frightened, as by an approaching aircraft, the birds take to the air and may circle overhead. Gulls also react slowly to approaching aircraft; consequently, they may not move out of the flight path of oncoming aircraft. They may fly directly into the path of aircraft landing or taking off if they are scared from their feeding or loafing site.

Gulls are attracted to airfields because of the relative security. The large areas of pavement and short grass provide gulls with good visibility, maintaining contact with other members of the flock and for defense against approaching danger (reference 3). The airfield also yields an easily accessible supply of food. Gulls readily feed on earthworms, which may surface and crawl onto the paved surfaces after heavy rains. Gulls will also follow mowers and feed on insects exposed by the grass cutting.



Figure 2. Gulls Attracted to Water-filled Depression



The base's current practice of mowing airfield grasses to seven centimeters contributes to the gull problem. The grass is mowed on a 14-day cycle with a maximum allowable grass height of 20 centimeters. Maintaining the grass this short provides an excellent habitat for gulls. In addition, close mowing encourages weeds (reference 8) which in turn, attract seed eating birds. Finally, close mowing increases maintenance costs. Short grass maintenance not only makes the airfield more attractive to gulls, but also makes the gulls harder to disperse from the airfield.

#### Recommendations

##### 1. Grass height:

a. Grass heights on the airfield should be kept between 18 and 30 centimeters. Taller grass will make the area less desirable for use by gulls and reduce grounds maintenance costs. Tall grass has been effective in Canada and Europe in reducing the numbers of gulls on airfields (reference 3). Because gulls require a clear view in all directions, tall grass will discourage gulls from the airfield and make those gulls feeding or loafing on runways or taxiways easier to disperse. Grass height is important because when the grass is cut too short, exposed worms and insects attract gulls in large numbers. If grass is allowed to grow uncontrolled, rodent populations may increase, attracting increased numbers of raptors. The recommended 18-30 centimeter grass height is a compromise between the two extremes.

b. To provide better airfield turf and to aid in rodent and insect control, the grass should be cut short (eight cm) early each spring. Shorter grass will also permit better penetration of early spring insecticide applications. The grass should then be allowed to grow and be maintained at the 18- to 30-centimeter height for the remainder of the growing season. The last mowing should be accomplished early enough in the fall to allow the grass to grow to approximately 30 centimeters for the winter months.

c. Since cutting tall airfield grasses will expose invertebrates and rodents which attract birds, mowing operations near active runways should be done during periods of reduced aircraft operations, such as weekends or nights, to reduce the temporary impact of increased bird activity.

2. Invertebrate Control: The current Japanese beetle control program should be continued as discussed in the Dover AFB Land Management Plan (reference 9) as insects are a potential bird attractant.

##### 3. Gull Control Techniques:

a. The bird dispersal team should be armed with either shotguns firing live ammunition, or the M-1 pyrotechnic pistol firing the M-74 airburst. Both have been effective in dispersing and controlling the

flight direction of bird flocks. The 12-gauge shotgun listed in TA 483 is authorized for bird control. Field loads of bird shot are also effective in dispersing birds.

b. The M-74 airburst, fired from the M-1 pyrotechnic pistol is safe and readily available through military supply channels. The M-74 airburst has recently been authorized by Hq USAF for use in base-level bird control. The airburst has good range and is effective against most birds. When using the airburst or shotgun, the operator should position himself between the runway and the birds or opposite the desired direction of dispersal, and fire towards the birds. The bursts should detonate on the near side of the flock, driving them in the desired direction. Firing must be coordinated with the tower and firing near aircraft should be avoided. Projectiles exploding near the ground may start grass fires. Two fire extinguishers must be carried with the ordnance (See AFR 127-100).

#### 4. Bioacoustics:

a. Bioacoustics is a control technique using recorded calls emitted by a bird under stress. These calls are species specific; calls effective against one species may not work against another species. The equipment previously listed should be obtained and mounted in the bird control vehicle. In the field, the operator identifies the species of bird and selects the proper tape. The vehicle is driven to within 90-180 meters of the birds. The distress call is then played for 20 seconds and shut off. If the birds have not moved within one minute after the recording is stopped, it should be played for another 20 seconds. If the gulls have not moved by the third attempt, it is unlikely that they can be dispersed by the distress call. Do not allow the tape to run longer than 20 seconds or birds may quickly become habituated to the distress tape. Once flushed into the air, the gulls will fly toward the distress call, spiraling higher and higher. After the gulls have investigated the "distressed bird," they will disperse. Dispersal can be hastened by reinforcing the distress call with pyrotechnics or occasionally killing one or two birds with the shotgun loaded with #4 or #6 field loads. Because they are protected, a federal depredation permit must be obtained prior to killing any gulls.

b. This harassment program must be continuous. The team must be able to respond whenever hazardous numbers of gulls are on the airfield. Distress calls and pyrotechnics should be used only to the extent necessary to disperse the birds. Excessive use of either will result in the birds becoming habituated to the control efforts, making the program ineffective.

c. Pyrotechnics can also be used to disperse waterfowl and other birds from the airfield. Even though it may not be possible to chase hazardous birds from the base boundaries, they can be moved from the active runway to areas where they do not present a significant threat.

### C. OPERATIONAL CONSIDERATIONS

Aircraft using the rectangular Visual Flight Rules (VFR) patterns at Dover AFB are required to maintain an altitude of 1500 feet MSL. The minimum altitude for Instrument Flight Rules (IFR) patterns is 1700 feet MSL. These altitudes are maintained until further descent is necessary for safe landings. The rectangular patterns for Runways 01, 19, and 32 overfly areas where large concentrations of waterfowl winter. In addition, the Tactical Air Navigation (TACAN) approach to Runway 19 crosses directly over the Bombay Hook National Wildlife Refuge.

Most of the operational activity around Dover AFB is affected by large numbers of birds that frequently overfly the vicinity during much of the year. Bird altitudes may vary from near the surface for birds flying point to point in the vicinity, to 10,000 feet above ground level (AGL), for flocks of migrating waterfowl. The greatest hazard to aircraft operating below 3000 feet MSL is during takeoff or when in local patterns for multiple approaches. Bird strikes on takeoff are more hazardous than those on landing because of the greater aircraft gross weight and higher power settings during takeoff and departing climb.

#### Recommendations

1. Bird observations: Air Traffic Control (ATC) personnel must maintain a constant watch for birds. Tower personnel should routinely scan local airspace with binoculars before aircraft arrivals or departures to determine whether hazardous birds are present. If birds are observed, aircrews should be advised of the hazard. Crews should be informed when avoidance procedures, as established by the Bird Hazard Working Group, are necessary. In addition, aircrews that observe birds in flight should pass this information to ATC so other aircraft may be warned.
2. Departing aircraft: Whether the problem is gulls on the airfield or a flock of geese over the runway's departure end, departing aircraft should delay takeoff until hazardous birds have dispersed. Once airborne, aircraft should make maximum performance climbs to at least 1500 feet AGL to minimize exposure to most birds. A further climb to 3000 feet AGL significantly reduces the risk of a bird strike.
3. Arriving aircraft: Arriving aircraft should be alert for flocks of birds, especially when planning approaches to Runway 19. The Bombay Hook National Wildlife Refuge may support as many as 70,000 geese during peak fall migration. All arriving aircraft should remain above 3000 feet MSL as long as possible until further descent is necessary for a safe landing.
4. Multiple approaches: During periods of high bird activity, multiple approaches should be minimized to reduce bird strike probabilities. Since migration occurs to a large extent at night, night multiple approaches during migration peaks should be reduced to as few as possible.



5. Runway changes: When hazardous bird activity is observed, runway changes should be considered to minimize the hazard. If a hazard develops off one end of the airfield, opposite traffic for arrivals and departures may be considered (landing on Runway 01 and departing Runway 19), weather and traffic permitting.

#### D. WATERFOWL

Large numbers of waterfowl winter in Delaware on the lands surrounding Dover AFB from October through March each year (table 1). Bombay Hook National Wildlife Refuge reports a peak of 70,000 Canada Geese (Branta canadensis) at the end of October with a wintering population of 25-30,000 (reference 10). Ducks on the refuge peak at 30,000 in late November and early December. Mallards (Anas platyrhynchos) and Black Ducks (Anas rubripes) are the principle species. Numbers of Whistling Swans (Olor columbianus) have increased in the area during recent years (reference 7).

TABLE 1

Mean waterfowl populations at Bombay Hook National Wildlife Refuge, Delaware, from Fish and Game Department Waterfowl Census, 1974-1977 (reference 7).

<u>MONTH</u>	<u>DUCKS</u>	<u>GEESE</u>	<u>SWANS</u>
October	37,712	99,913	6
November	37,949	68,400	68
December	42,148	48,169	1,010
January	49,091	83,257	2,208

A flock of approximately 700 swans now winters in the Little Creek Wildlife Area. Because of their large size (up to 8.44 kilograms), these birds are particularly important hazards, and their numbers and activities should be closely monitored. Large numbers of both geese and ducks cross the airfield, rarely exceeding 3,000 feet AGL, between the tidal marshes on the refuges and the fields where they feed. Although relatively few waterfowl were observed on the airfield, they do present a hazard to aircraft during takeoff and landing. During the BASH survey, a C-5 sustained damage to its radome when it struck a goose.

#### Recommendations

1. Waterfowl movement: Wildlife personnel working at Bombay Hook and Little Creek keep accurate, current information concerning waterfowl

migration in and out of the area. Base Operations personnel can use this information to remain aware of bird concentrations. A large percentage of migration occurs at night. During peak migration periods, local night sorties and multiple approaches should be reduced. In addition, reducing the number of sorties during early mornings and late afternoons--times when waterfowl are most active--will help reduce bird strike potentials.

2. Avoidance procedures: Aircrews can reduce the bird strike potential by spending minimum time at altitudes below 3000 feet AGL (Observation C). Crews must also increase surveillance for birds when flying at low altitudes. Bird sightings should be reported to ATC so the information can be passed to other aircraft.

#### E. STANDING WATER AND DRAINAGE

Many depressions and drainage channels on the airfield accumulate standing water after heavy rains. These low-lying areas provide habitat for a variety of birds. Occasionally, the BASH team observed small flocks of Mallards, Pintails (Anas acuta), and Black Ducks feeding and resting in these low areas. Several flocks of Horned Larks (Eremophila alpestris) were also observed.

#### Recommendations

1. Grounds Management: Low areas on the airfield should be filled. Even small depressions can collect appreciable amounts of water after rains, attracting ducks, gulls, and other birds. Immediately after a heavy rainstorm, these areas should be marked by Civil Engineering personnel and recorded on topographical maps. Work should then be scheduled to fill in these areas as a part of a long-range plan for airfield improvement. Material should be delivered to the low areas and spread at the same time. These areas should then be seeded with a commercial grass mix to control erosion.

2. A practical method of bird control in the wide, deep drainage channels is to place wire in a zig-zag pattern across the water. This method has been successful in discouraging many birds from using water filled drainage channels in Canada and Europe (reference 4). Posts should be spaced 2 meters apart at the water's edge, and the wire should be placed 30 to 45 centimeters above the water to permit easy passage of materials through the channel. To clean the channel, remove the wire, clean, and replace the wire. This method should be used on the channels located between the parallel taxiway and Runway 01, the channels in the infield areas near the TACAN station, the drainage ditch at the approach end of Runway 14 and the three-quarter taxiway, and the drainage channels behind the engine test area. At least 10-gauge wire should be used to minimize injuries to birds striking these wires. An adequate substitute for the wire is 50 to 100-pound test nylon monofilament fishing line.

3. Water Drainage: Drainage ditches should be kept cleared of vegetation. Although drainage ditches on Dover AFB were relatively free of vegetation during this survey, they may clog with vegetation or eroded soil, and impede water flow. Insects and aquatic life flourish in clogged drains, culverts, and ditches, providing birds with a food source. All drainage channels should be cleared at regular intervals (at least yearly). Aquatic vegetation should be removed and culvert screens and drain gates should be cleared. Where pools have been created beneath culvert openings by water action, they should be filled with rock and gravel to eliminate the standing water.

#### F. RAPTORS

Marsh Hawks (Circus cyaneus) were the most commonly observed raptors on the airfield. Other hawks and owls hunt on or near the base. Refuges and other favorable habitats in the area maintain large populations of raptors. The only active Bald Eagle (Haliaeetus leucocephalus) nest in Delaware is located on the Bombay Hook Refuge. Of the eight bird strikes in which bird species were identified, four involved raptors. An Osprey (Pandion haliaetus) was involved in a bird strike with a C-5 during 1977. Raptors are normally seen alone at all altitudes up to 10,000 feet AGL, depending on weather conditions.

On-base food sources for raptors such as reptiles, amphibians, birds, small mammals, and insects occur in moderate numbers on the airfield. If available food sources increase, an increase in raptor activity can be expected.

#### Recommendations

1. Personnel Awareness: Tower and airfield management personnel must be aware of the potential for hazards associated with raptors, especially on warm afternoons when updrafts are conducive to soaring. Aircrews should be alerted to the presence of any large birds over the airfield. If pilots know the birds are present, collisions may be avoided.

2. Active Control: If raptor populations increase significantly, a serious bird strike potential may develop. Because birds of prey are protected under federal law, control measures are complicated. Personnel of the US Fish and Wildlife Service provide assistance in control problems. If a problem develops, their help should be sought following consultation with the BASH Team.

#### G. BLACKBIRDS

Several small flocks of blackbirds were observed on the airfield during the survey. Although small groups of these birds do not present a major hazard, large trailing blackbird flocks represent a significant bird strike threat.



### Recommendations

Avoidance: Overflights of blackbirds which neither roost nor feed on the base cannot be controlled. The only way to reduce the hazard is avoidance by aircrews. Crews should be informed of local bird hazards through radio communication and implementation of BIRD WATCH. When high bird densities are present, avoidance procedures, as established by the BHWG, should be implemented.

#### H. PEST BIRDS

Hangars and buildings on Dover AFB were surveyed for pest bird problems. Although pest birds do not add significantly to the bird strike threat, they cause wasted man-hours in cleanup and their corrosive droppings also damage equipment (figure 3). In hangars where problems are severe, the birds may represent a health hazard as heavy accumulations of droppings have been linked to several diseases.

### Recommendations

1. The base should document man-hours and resources expended as a direct result of pest bird activities. This data could then be used to justify control programs based on cost effectiveness.

2. The present practice of using Rid-a-Bird perches in hangars should be continued.

3. If pigeons become a serious problem, trapping may be necessary to permanently remove the birds from the area. To successfully trap pigeons, follow the birds early in the morning as they leave the hangar to feed. Establish feeding areas and prebait with cracked corn for fourteen days to lure the pigeons to the food source. On the fifteenth day, place traps in the area. Place cracked corn, water, and decoy birds in each trap. Post signs advising personnel to remain clear of the trapping area. After trapping has begun, make daily checks of the traps to remove birds and add bait. Allow decoy birds to remain in the traps. Pigeons should be disposed of by the base veterinarian and incinerated. Obtain further details concerning trap design from the BASH team.

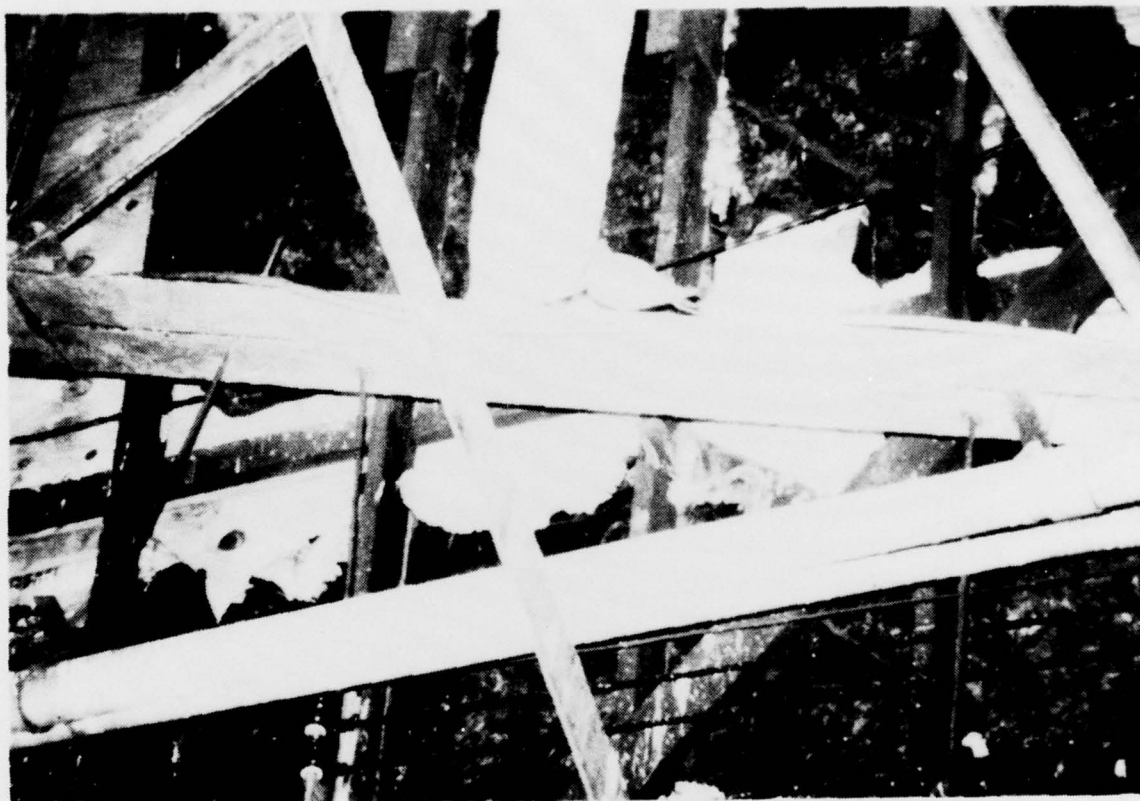


Figure 3. Unsightly Bird Droppings Indicate Pest Bird Problem

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